DOCUMENT RESUME

ED 155 580 CG 012 701

AUTHOR De Graaf, Carl; Briggs, Richard
TITLE A Data Based Assessment of Relative Need for Scarce Professional Resources.
PUB DATE 28 Sep 77
NOTE 23p.; Paper presented at the Conference of the Evaluation Network (3rd, September 26-28, 1977, St. Louis, Missouri)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Administrative Problems; *Data Analysis; Human Resources; *Needs Assessment; Organization; *Professional Personnel; Program Descriptions; *Resource Allocations; *School Administration; School Districts

ABSTRACT

This paper points out that the assignment of individuals to serve sub-units of an organization is one of the significant problems which must be faced by administrators and supervisors of school psychology and school social work services. It then describes the development and implementation of a simple weighted proportion procedure for estimating relative need among various sub-units of an organization, in this case, attendance areas within the school district. The procedure begins with the identification, collection, and weighting of descriptive data judged to best represent need or demand for services. The procedure yields proportions and percentages for each sub-unit which can be used to distribute professionals' allocations. It shows how use of this procedure can reduce the amount and severity of political bickering over which unit has the most need under what circumstances, and thus requires more services at the expense of some other unit. The paper ends by suggesting other contexts to which the procedure might be generalized. (Author)

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ED155580

A Data Based Assessment of Relative Need for Scarce Professional Resources

Carl deGraaf, Ph.D.
Henderson State University
Arkadelphia, Arkansas

Richard Briggs, M.A.
Madison Metropolitan School District
Madison, Wisconsin

Presented at

The Third Annual Conference of the Evaluation Network

St. Louis, Missouri

September 26-28, 1977

CG 012701

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Preface

The procedure we are about to describe is itself the result of a fortunate blend of need and resources. One of us (deGraaf) administered both psychology and social work services in the Madison school system and provided the basic framework and conceptualizations for the procedure. The other provided the necessary number crunching skill to put the procedure in operation. These initial compartmentalizations have blurred over the last two years to our mutual benefit.

We wish to acknowledge that we could not have developed and implemented the procedure without the willing aid and cooperation of many others. We thank our colleagues in Madison Metropolitan School District for their support, encouragement, and willingness to try new techniques to solve old problems. We thank our fellow administrators of Specialized Educational Services for their advice and support during early developmental stages of the procedure. Finally, we thank Carol Ziesemer and Dr. Clarence DeSpain, Professional Support Persons for Social Work and Psychology, for their aid in identifying, collecting and organizing the necessary data; and we thank Dr. Timothy Crowner for encouragement when it was most needed.

This procedure would have been unnecessary without the presence and activism of school based psychologists and social workers who both created demand by skillfully meeting needs and initially identified the need for some type of data based way of making assignments.

Background

Suppose you run a boarding house where forty-six boarders sit at four tables to eat meals. The menu consists mostly of spoonable stews and soups with a few larger chunks requiring knives and forks. Suppose that you have enough spoons for everyone but only about seventeen sets of knives and forks. And, like all good boarding home mothers, you insist that each diner's bowl be cleaned before leaving the table. To add to your problems, recent health regulations insist that your fare become, with apologies to Campbell Soups, so chunky you are tempted to eat with a fork. Of course, diners compete for scarce utensils and you must find ways of sharing them. Well, analogies have limits, but this one captures many of the dynamics of assigning school psychologists and social workers within a school district.

Madison Metropolitan School District (MMSD) has four high schools, ten middle schools, and thirty-two elementary schools serving about 28,000 students. The district is organized into four attendance areas centered around each of the comprehensive high schools. Each area is subdivided into clusters centered around the middle schools and their feeder elementary schools. There are about 16 social workers and 18 psychologists available for school based work out of a total of about 50 allocations for these two services. The district reorganized from an elementary/middle/high pattern to attendance areas in an attempt to decentralize operations and to provide the basis for vertical, rather than horizontal, district-wide planning and programming. The assumption is that programs and services could be better coordinated were the district organized by attendance and feeder schools rather than by level of instruction.

One effect of reorganization was to coalesce multiple, relatively small, competing demands into four relatively powerful collections of staffs who developed common interests and goals. One of their demands was for more assignments of allocations for school based psychologists and social workers to their own areas, at the expense of other attendance areas if necessary. A more effective organization was not, however, the only influence at work.

Concurrently, the movement to guarantee free, public, appropriate education for disabled and handicapped students culminated in the passage of laws and administrative rules[1] which prescribed an elaborate, multidisciplinary, diagnostic process to determine whether each referred student required exceptional education. Members of both services perform key functions in the multi-disciplinary team processes. In addition, both services moved to provide more intensive support to both regular and exceptional educators. Finally, both services continued to fulfill 'traditional' roles dealing with academic, behavioral, adjustment, family, and community-related problems.

Scarcity is a function of available quantity and 'consumer' demand. While it is true that the quantity of both services' allocations have nearly doubled in the past decade, demand has increased much more rapidly. In part the increase in demand was due to decentralization and more intense roles and functions. It was due also to an improved quality of service delivery. The increased availability of trained and willing professionals has changed consumers' perceptions of problems. New problems and tasks have emerged as critical needs where before they might not even have been perceived, let alone addressed.

A decade ago Madison's psychology and social work services were nominally based in a centralized pupil services unit. In reality, each worker was more

or less permanently assigned to several local school buildings. This assignment pattern was primarily devoted to covering the district with services rather than attempting to tease out and respond to both district and local school building needs and priorities. In addition it was difficult to match local needs with particular individuals' skills or to provide the mobility and flexibility to deal with temporarily acute problems. Thus it made sense to assign workers to areas and clusters rather than to specific buildings.

Traditional assignment patterns would have to be changed to respond to these influences. And changed they were. Predictably the changes were resisted and both principals and individual professionals sought alternative ways of gaining their ends. The principals tended to believe that staff were being taken away from them - in part this was a true perception - and many professionals agreed with neither reassignment nor increased identification with exceptional education. Thus the stage was set for conflict. At stage center stood the coordinator for psychology and social work services.

Each area director, acting on input from principals and staff, marshalled data and arguments to highlight the most salient problems and factors characteristic of their own attendance areas in an effort to demonstrate their relatively more acute need. Individuals and groups within both services brought forward their own ideas of needs and priorities which ought to be served. And closest to home, fellow administrators of programs and services for students with needs for exceptional education put forward their own critical needs. After receiving all this input, whether solicited or proffered, there remained the unenviable task of sorting through divergently expressed needs ranging from socio-economic factors to truancy rates to numbers of handicapped students to

mismatches between skills and locations. In the end it was subjective, albeit professional, judgment which determined annual assignments.

The processes leading up to and following after the event of making 'final' assignments cannot be described as anything other than 'political.' The coordinator was at the vortex of compromises, negotiations, connections, communication channels, tradition, change, rules, and power. Of course, this situation rather quickly led to more or less fruitless exchanges of personally held opinions, beliefs and values about which problem or priority was more critical and hence represented the greatest need. And it also meant that the coordinator's decision was eminently appealable. If initial assignments weren't satisfactory - they never were - then other, possibly more powerful, channels of influence were used.

We do not mean to imply that the mediation of organizational conflict by political means is inherently evil or unnecessary. Quite the contrary. We believe that some political processes are more rational and potentially more fruitful than others. One of us (deGraaf) saw that the political process could be enhanced by introducing a common language and data base which might change the coin of decision-making activities.

In summary, our need for a consistent, data-based way of making assignments grew out of the existence of conflicts among district personnel about what was a fair distribution (i.e., assignment) of psychology and social work allocations. The conflicts grew out of a scarcity of professional resources, recent changes in the scope and intensity of professionals' roles, and more powerfully organized sub-units resulting from decentralization. Moreover, while we had confidence in our subjective professional judgments, we wanted to ensure that areas with the greatest need received the highest proportion of limited resources by the use of a clearly understood, justifiable, agreed upon data base.

We turn now to describe the process of instituting the new procedure, the assignment procedure itself, and an example of how it is currently used. As you shall see, both heads of table and diners became better equipped to deal with the matter of sharing knives and forks.

Change Process

We altered the way psychologist and social worker allocations were assigned by first securing agreement on the broad outlines of the procedure before using the procedure to reveal ultimate outcomes. We were able to take advantage of widespread dissatisfaction with existing assignment procedures; we did not have to provide the initial impetus for change. We also took advantage of the fact that most diners were more upset by the process of getting their fair share of utensil use rather than being unwilling to make do with what was available.

The first step was to draft a proposal which outlined a weighted factor procedure along with a schedule of groups and individuals who would be asked to review, approve and provide input. The first communication was directed to the professional staff and principals. This communication was reviewed and approved by administrative groups for Specialized Educational Services and the entire district, the latter included the directors of each attendance area. All groups accepted the proposal.

The next step was to collate and use data to project initial assignments. The formula outcomes were returned to all interested groups for their review and input following the schedule outlined in the initial proposal. Since our

intent in this first year was to institute a new procedure we chose weights which made only trivial changes in existing assignments. It is important to remember that these existing assignments were the result of some long - and sometimes painful - negotiations and compromise and, while nobody was thoroughly satisfied, most had a considerable stake in maintaining what had already been achieved. Our intent was to demonstrate that everyone's needs had been weighted in the same, admittedly tentative balance.

We also took advantage of rounding errors accumulated during calculations to withhold a small amount of allocation from the assignment process. Each staff and administrative group was informed of the size and existence of unassigned allocations and invited to provide further input for last minute adjustments which would take place upon the start of school in the fall.

Some changes were made in the procedure for the next year. The first was that professionals from each service determined the factors and their associated weights, for example, social workers formed a committee to perform this task. Secondly, all the factors were objective. One of the factors in the first year had relied on estimating relative socio-economic needs by assigning each elementary school to a high/medium/low category. While these estimates were very reliable from person to person, most staff desired more concrete measures. Finally, both services used differently weighted combinations of the same objective factors. This was done to reflect known differences, as well as similarities, among the two services.

The Procedure

The procedure centers around use of a formula which combines descriptive data on the district and each attendance area into a series of weighted factors. The first step is for the professional staff to identify and weight factors. The second step is to gather and compile descriptive data representing each factor. Obviously some compromises have to be made between theoretical purity and practical contraints in the choice of factors. We were fortunate to have considerable data already available along with a certain degree of theoretical uncertainty. We tried to incorporate data from multiple sources in order to fairly represent a wide spectrum of needs.

The third step is to combine weights and factors to yield a percentage of need for each factor for each attendance area. This step will be clearly outlined in the next section. Finally, summed percentage of need are used to distribute assignments of allocations. The results are carried to the professional staff, school principals and relevant administrative groups. In practice, we continue to hold back a very small proportion of allocations to make later adjustments, so the first assignment patterns are considered initial ones. Since all groups have access to the same data base and can talk in terms of the same factors and their relative importance, further discussion and negotiation becomes oriented toward strategies to meet unusual needs and to solve particular problems. It is important to note that these discussions are carried out by groups and individuals who will have to do the work or are responsible for supervision and administration.

The Procedure Applied

We now describe how the procedure was applied to assign psychology and social work allocations for the 1977-78 academic year. The formula is:

$$\sum_{1}^{I} A_i = 100 = \sum_{1}^{J} W_j F_j$$

(I) is the total number of administrative sub-units (A). Each (A_i) is a percentage of total district need. (J) is the number of weighted (W) factors (F). We chose to set the total district need at 100 to get a common base and to be able to use percentages for ease of communication. We set $\sum_{1}^{J} W_j = 100$ and each (F_j) = 1.00 so that each ($W_j F_j$) is also a percentage. The variable (F) and its associated (W) are chosen by the profession. The figures of interest, $(\sum_{1}^{J} W_{ij} F_{ij})$ are calculated from descriptive data by summing (J) weighted factors in each attendance area (A_i).

Table 1 shows factors and associated weights used in making assignments for 1977-78.

Table 1

Factor	Psychology		Social Work	
I. Buildings	10%		10%	
II. Number of Students	15%		15%	
III. Non-Attendance Rate	10%		15%	
IV. Mobility	10%	Ecology*	15%	
V. Income	10%		15%	School-Community**
VI. DCDSS Youth Referrals	---		15%	
VII. Exceptional Education Programs	40%		15%	

* Psychology services grouped non-attendance, mobility, and income under the heading of "Ecology Factor" and weighted it 30%.

** Social work services grouped non-attendance, mobility, income, DCDSS youth referrals, and exceptional education programs under the heading "School-Community" factor and weighted it 75%.

The factor 'Buildings' was chosen to represent the existence of organized entities having their own unique goals, problems and priorities. We assumed that increasing the number of buildings would increase the amount of demand for services. The descriptive data were simply the count of each elementary, middle and high school building. The factor 'Number of Students' was chosen to rep resent the pool of possible referrals from which each worker's case load would be drawn. Since both professions deal with all students, not merely those with needs for exceptional education, we used recent enrollment data to represent this factor. Factor III, 'Non-Attendance' was chosen because it is a common problem frequently referred to both services. In addition it might represent

more general considerations such as student motivation and exposure to instruction. Data for this factor were compiled from the Registrar's records of attendance for the first two quarters of 76-77 and converted to a percentage of enrollment of each school. The changedness of each school is represented by the 'Mobility' factor and emerged from the professionals' belief that schools with high mobility rates were also the source of many problems. Descriptive data were computed by summing new enrollments, transfers and withdrawals for the first three quarters of 76-77 and dividing by the second quarter's enrollment for each school. 'Income' was drawn from data compiled by the district's Title I staff. Here the data were counts of students receiving free or reduced cost lunches combined with census tract counts of families on AFDC. The factor 'DCDSS Youth Referrals' is an independent measure of need more applicable to social work than psychology in the judgment of the professionals involved. The descriptive data were counts of referrals from each cluster. The last factor, 'Exceptional Education Programs,' was chosen to represent the demand for diagnostic and instructional support services. Initially, we considered weighting different types of programs differently, however, we could reach no agreement on what type to weight more heavily and settled for a simple count of exceptional education programs in each attendance area.

Each service chose a different set of weighted variables. While a considerable amount of their work is similar in terms of presenting problems, their work is also different in thrust, intent and requisite training. The procedure does not require that both services adopt the same weighted factors. Indeed, the procedure can handle any data and distribution of weights providing the restrictions of the formula are observed.

The next step is to compile a summary table showing both primary data and derived proportions for each attendance area. Proportions for each cell are based on column sums shown in Table 2.

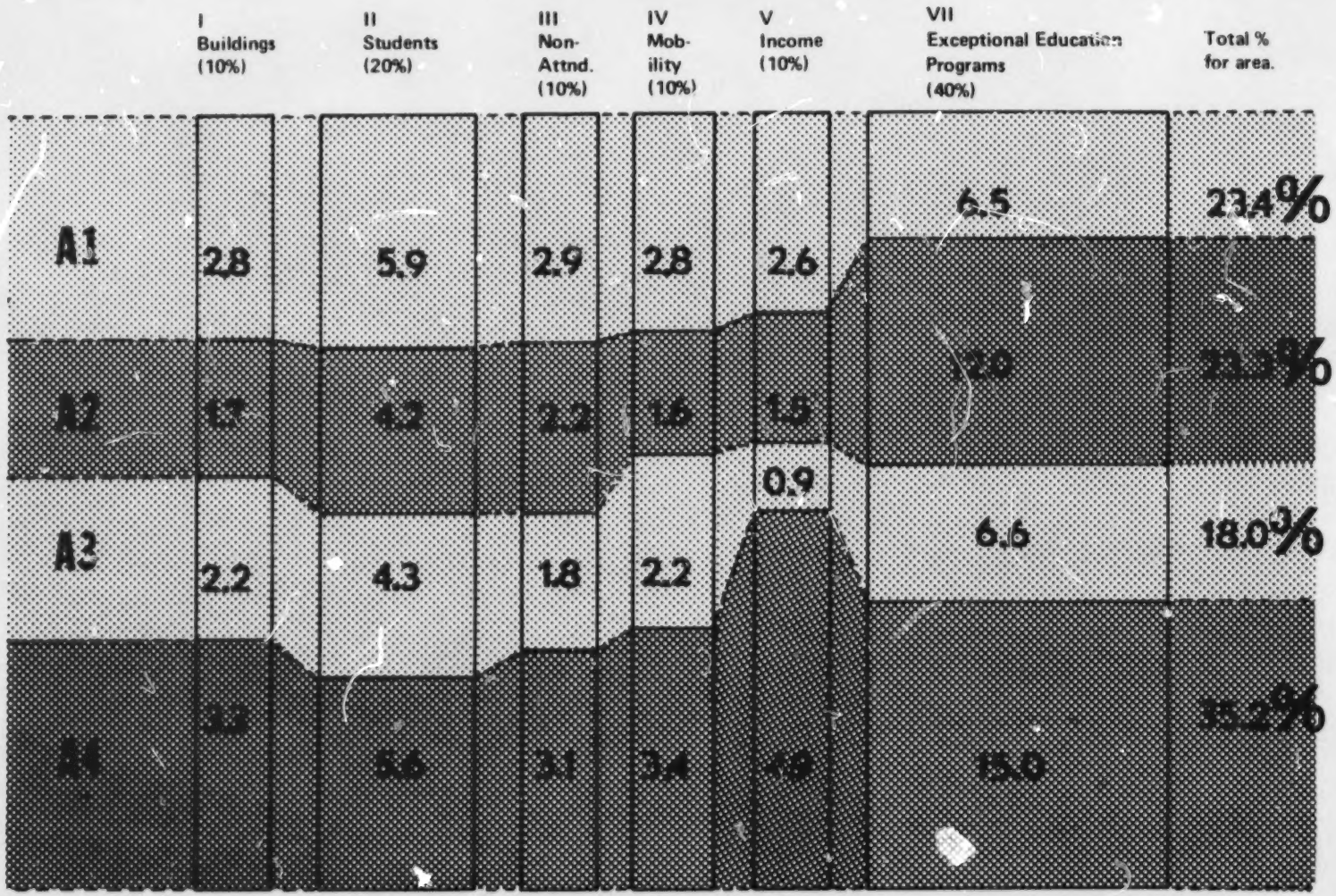
Table 2

Attendance Area	Buildings	Students	Attendance	Mobility	Income	DCDSS Referrals	Excep. Educa. Programs
A_1							
Primary	13	8331	25.4	28.99	29.53	30.70	23.0
Proportion	0.2826	0.2939	0.2890	0.2782	0.2617	0.3066	0.1614
A_2							
Primary	8	5999	19.3	17.03	17.42	14.93	52.0
Proportion	0.1739	0.2116	0.2196	0.1634	0.1544	0.1490	0.2997
A_3							
Primary	10	6053	15.9	22.96	10.59	4.23	28.5
Proportion	0.2174	0.2153	0.1809	0.2203	0.0939	0.0422	0.1643
A_4							
Primary	15	7959	27.3	35.23	55.28	50.30	65.0
Proportion	0.3261	0.2811	0.3106	0.3381	0.4900	0.5022	0.3746
Totals							
Primary	46	28352	87.9	104.21	112.82	100.16	173.5
Proportion	1.000	1.000	1.000	1.000	1.000	1.000	1.000

The next step is to combine the weights and proportions and display them as percentage of need as shown in Figures 1 and 2. All numbers on these figures are percentages and the row sums represent the total percentage of need or demand for services for each attendance area. We choose this display because it is easily understood and it graphically represents comparative need of each area.

Finally, the percentage need for each attendance area is multiplied by the number of allocations available for school based assignment. For 77-78, Madison has 23.6 social work and 25.4 school psychology allocations. Of these, 7.5 social work and 8.2 psychology allocations were initially reserved for special projects and programs like Title I, Early Childhood Programs, and other high need,

FIGURE 1

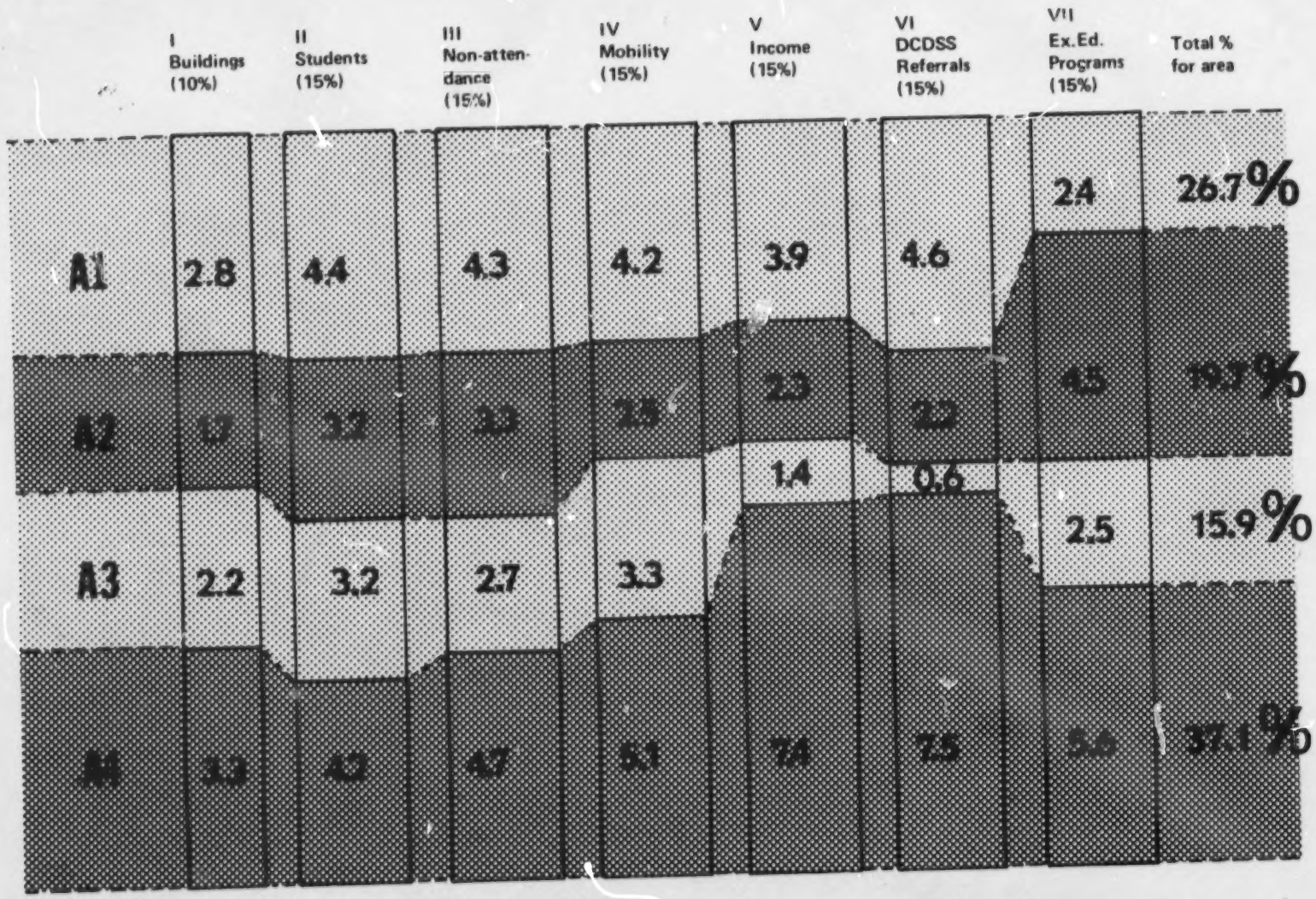


Distribution of Demand for School Social Work Services
Numbers in each block are percentages for each factor for each attendance area.
Each block's area (h x w) represents the percentage shown.
Rounding errors account for fractional discrepancies.

15

16

FIGURE 2



Distribution of Demand for School Psychology Services
Numbers in each block are percentages for each factor for each attendance area.
Each block's area (h x w) represents the percentage shown.
Rounding errors account for fractional discrepancies.

low incidence exceptional education stations. The data for formula based and actual assignments of allocations are shown in Table 3.

Table 3

Attendance Area and Percent Need	Psychology Initial By Formula	Psychology Actual Assignments	Social Work Initial By Formula	Social Work Actual Assignments
A_1	4.259	5.1	4.229	4.5
A_2	4.241	4.0	3.172	3.2
A_3	3.276	3.2	2.560	2.6
A_4	6.406	6.4	5.973	5.8
Available Allocations April-May 77		18.2		16.1
Allocations Assigned by Formula	18.182		16.003	
Reserve	.018		.097	
Actual Assignments September 77		18.7*		16.1

* 0.5 allocations were transferred from programs and projects in order to get the extra .5 assignment.

Discussion

Our use of this procedure has mediated an area of conflict involving strongly held professional opinions and values concerning who gets what resources. The procedure has enhanced the use of joint decision making, administration and supervision by introducing a common language and data base which, in turn,

enables all parties (staff and building and district administrators) to participate in defining service priorities. And all parties can participate in the decisions necessary to address priorities. The procedure is a key element in educating district personnel in the priority setting process. The individual professional can better gain and hold local building administrative support during the year of assignment because the principal has access to clearly described district needs and can set his or her own in that context. In turn this fosters principal advocacy and commitment to the professional's work. And too, the principal is in a better position to guide and supervise the individual professional when his or her knowledge includes other demands upon the worker's time. Finally, the joint decision-making process leads to reduced central office/local building conflict. Joint, cooperative supervision tends to become real, not contrived, and hence establishes a more productive climate for both staff and administration.

Psychologists and social workers also participate in a service evaluation process administered by members of both services. In addition members of both services provide a sample of how much of their time is devoted to matters involving exceptional education. Finally, members of both services participate in the ordinary teacher evaluation process as outlined by the district's master contract. The procedure we have described provides additional, supportive data which allows both the individual professional and his or her supervisor to ask key questions about their own performance in meeting district needs.

Clearly, however, the procedure fails to address the question of how many knives and forks the boarding house should have. Current Department of Public Instruction Rules set a student to psychologist ratio of 1500 to 1 for school based assignments. Our procedure requires that an <u>a priori</u> level of allocations

be established before it can work. There is a major difference between the state's recommended levels and the actual, absolute need; which has never been clearly established. We recognize this as a major theoretical and practical problem. We do not recommend that state agencies use a proportionate procedure such as ours for determining recommended levels of psychology and social work allocations. Rather, such agencies should take the lead in finding factors and variables which might add up to an absolute need level as opposed to trying to fairly distribute a scarce professional resource.

In a related vein, our procedure does not directly address needs for professionals' services in student or problem oriented terms of referrals for academic or behavioral problems. Indeed, we have equated 'need' with 'demand for service' and represented both by attendance area, district, and community data only theoretically related to needs as expressed by type, quantity, and quality of referrals for specific student and family problems. Currently, the latter type of data are being collected via the service evaluation process. One potential avenue of development in the future is an attempt to incorporate service evaluation and time logging data with our own procedure for determining relative need. As of now, however, the proper way to do that is not at all clear.

We believe the process can be enhanced by preceding the first communication about an upcoming set of assignments with evaluative and descriptive data about the current year's performance. As time goes on and we gain more experience in using the procedure to make assignments as well as collecting and using evaluation data, we should be able to correlate a past year's performance with its assignment pattern and compare that data to the current year's performance and its assignment data. We then might be able to better project an adequate assignment pattern for the upcoming year.

We think the procedure might be applied to other situations where there is a scarce professional resource and correspondingly high demand for service. We suggest that the procedure might be used in assigning almost any itinerant or quasi-itinerant service where there exist descriptive data applicable to all sub-units, where there is an a priori finite limit set on the availability of that professional resource, and where the professionals involved are willing to devote the time and work to identifying factors and assigning relative weights. We think the procedure may be applicable to assigning music, art, physical education, speech and language teachers as well as other types of itinerant services such as school and community nurses. It might also be possible to use the procedure for determining administrative assignments although we have not explored this area at all.

You may remember the childhood rule involved in dividing an apple or piece of cake among two children, both of whom wanted the biggest piece. The rule is the one cuts while the other gets to choose first. We believe that our procedure provides a way for everyone to participate in both the cutting and choosing. Now... if we could only get those boarding house diners to set up some factors and weights...

Notes

(1) Laws of Wisconsin Relating to Public Schools. Madison, Wisconsin: Wisconsin Department of Public Instruction, (Bulletin 5700), 1974.

Wisconsin Administrative Code, Rules of the Department of Public Instruction. Madison, Wisconsin: Department of Public Instruction, May, 1977.

Biographical Notes

Carl deGraaf served as Coordinator of Specialized Educational Services in the Madison Metropolitan School District, Madison, Wisconsin from 1972 to 1977. He was responsible for the administration and supervision of school psychology and social work services during that period of time. He is currently Assistant Professor of Special Education at Henderson State University, Arkadelphia, Arkansas.

Richard Briggs served as Coordinator of Specialized Educational Services in the Madison Metropolitan School District, Madison, Wisconsin from 1974 to date. He is responsible for program evaluation and data management activities. He is currently continuing in that position.